1. Find the inverse of the function below. Then, evaluate the inverse at $x = 7$ and choose the interval that $f^-1(7)$ belongs to.

$$f(x) = \ln(x - 5) + 3$$

A. $f^{-1}(7) \in [162751.79, 162762.79]$

B. $f^{-1}(7) \in [45.6, 50.6]$

C. $f^{-1}(7) \in [55.6, 61.6]$

D. $f^{-1}(7) \in [9.39, 11.39]$

E. $f^{-1}(7) \in [22030.47, 22034.47]$

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2. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \frac{4}{4x - 19} \text{ and } g(x) = \frac{2}{6x - 29}$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-8.67, -3.67]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [2, 8]$

C. The domain is all Real numbers except $x = a$, where $a \in [-9.2, -2.2]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-0.25, 8.75]$ and $b \in [2.83, 6.83]$

E. The domain is all Real numbers.

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3. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -11$ and choose the interval that $f^-1(-11)$ belongs to.

$$f(x) = \sqrt[3]{2x - 3}$$

A. $f^{-1}(-11) \in [661.2, 664.3]$

B. $f^{-1}(-11) \in [-666.5, -663.8]$

C. $f^{-1}(-11) \in [-668.5, -665]$

D. $f^{-1}(-11) \in [666.6, 669.2]$

E. The function is not invertible for all Real numbers.

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4. Subtract the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \frac{3}{4x - 17} \text{ and } g(x) = \frac{5}{5x + 34}$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [0.67, 10.67]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [0.5, 7.5]$

C. The domain is all Real numbers except $x = a$, where $a \in [-6.6, -1.6]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [2.25, 11.25]$ and $b \in [-9.8, -4.8]$

E. The domain is all Real numbers.

---

5. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = 4x^3 - 2x^2 - 3x + 1 \text{ and } g(x) = -3x^3 - 4x^2 + 4x + 4$$

A. $(f \circ g)(-1) \in [2.9, 5.2]$

B. $(f \circ g)(-1) \in [-13.3, -11.7]$

C. $(f \circ g)(-1) \in [-9.3, -5.2]$

D. $(f \circ g)(-1) \in [-3.7, 1.5]$

E. It is not possible to compose the two functions.

---

6. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = 4x^3 - 3x^2 - 4x \text{ and } g(x) = x^3 - 2x^2 - x$$

A. $(f \circ g)(1) \in [-37, -33.6]$

B. $(f \circ g)(1) \in [-43.1, -38.7]$

C. $(f \circ g)(1) \in [-35.4, -32.2]$

D. $(f \circ g)(1) \in [-46.5, -43]$

E. It is not possible to compose the two functions.

---

7. Determine whether the function below is 1-1.

$$f(x) = -18x^2 + 30x + 408$$

A. No, because there is a y-value that goes to 2 different x-values.

B. No, because there is an x-value that goes to 2 different y-values.

C. No, because the domain of the function is not $(-\infty, \infty)$.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. Yes, the function is 1-1.

---

8. Determine whether the function below is 1-1.

$$f(x) = -18x^2 - 27x + 551$$

A. Yes, the function is 1-1.

B. No, because there is an x-value that goes to 2 different y-values.

C. No, because there is a y-value that goes to 2 different x-values.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because the domain of the function is not $(-\infty, \infty)$.

---

9. Find the inverse of the function below. Then, evaluate the inverse at $x = 9$ and choose the interval that $f^-1(9)$ belongs to.

$$f(x) = \ln(x - 5) - 2$$

A. $f^{-1}(9) \in [1099.63, 1108.63]$

B. $f^{-1}(9) \in [59866.14, 59873.14]$

C. $f^{-1}(9) \in [51.6, 54.6]$

D. $f^{-1}(9) \in [1202602.28, 1202607.28]$

E. $f^{-1}(9) \in [59877.14, 59881.14]$

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10. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -13$ and choose the interval that $f^-1(-13)$ belongs to.

$$f(x) = \sqrt[3]{5x - 3}$$

A. $f^{-1}(-13) \in [439.58, 440.16]$

B. $f^{-1}(-13) \in [-439.47, -438.01]$

C. $f^{-1}(-13) \in [438.07, 439.06]$

D. $f^{-1}(-13) \in [-441.24, -439.27]$

E. The function is not invertible for all Real numbers.

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11. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = \ln(x - 4) + 2$$

A. $f^{-1}(8) \in [50.6, 61.6]$

B. $f^{-1}(8) \in [162749.79, 162758.79]$

C. $f^{-1}(8) \in [406.43, 412.43]$

D. $f^{-1}(8) \in [22026.47, 22035.47]$

E. $f^{-1}(8) \in [398.43, 402.43]$

---

12. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 9x^3 + 7x^2 + 8x + 4 \text{ and } g(x) = 7x^3 + 4x^2 + 9x + 7$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-7.5, -5.5]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [3.4, 6.4]$

C. The domain is all Real numbers except $x = a$, where $a \in [2.8, 9.8]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [6.25, 10.25]$ and $b \in [5.8, 8.8]$

E. The domain is all Real numbers.

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13. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 11$ and choose the interval that $f^-1(11)$ belongs to.

$$f(x) = 5x^2 + 3$$

A. $f^{-1}(11) \in [1.47, 1.75]$

B. $f^{-1}(11) \in [5.09, 5.31]$

C. $f^{-1}(11) \in [2.19, 2.55]$

D. $f^{-1}(11) \in [1.13, 1.27]$

E. The function is not invertible for all Real numbers.

---

14. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{-4x + 14} \text{ and } g(x) = 8x^2 + 8x + 5$$

A. The domain is all Real numbers except $x = a$, where $a \in [4.33, 13.33]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-7.25, 1.75]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-2.5, 8.5]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-0.67, 5.33]$ and $b \in [5.4, 10.4]$

E. The domain is all Real numbers.

---

15. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = -4x^3 + 3x^2 + x - 2 \text{ and } g(x) = -x^3 - 2x^2 + 3x$$

A. $(f \circ g)(1) \in [-7.5, -5.4]$

B. $(f \circ g)(1) \in [-1.8, -0.2]$

C. $(f \circ g)(1) \in [-3.8, -1.6]$

D. $(f \circ g)(1) \in [-10, -7.5]$

E. It is not possible to compose the two functions.

---

16. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = -2x^3 + 4x^2 - 4x \text{ and } g(x) = -x^3 + 2x^2 - x + 3$$

A. $(f \circ g)(1) \in [27, 35]$

B. $(f \circ g)(1) \in [-35, -28]$

C. $(f \circ g)(1) \in [20, 23]$

D. $(f \circ g)(1) \in [-23, -22]$

E. It is not possible to compose the two functions.

---

17. Determine whether the function below is 1-1.

$$f(x) = -12x^2 - 99x - 195$$

A. No, because the domain of the function is not $(-\infty, \infty)$.

B. No, because there is an x-value that goes to 2 different y-values.

C. No, because the range of the function is not $(-\infty, \infty)$.

D. No, because there is a y-value that goes to 2 different x-values.

E. Yes, the function is 1-1.

18. Determine whether the function below is 1-1.

$$f(x) = (5x - 36)^3$$

A. No, because there is an x-value that goes to 2 different y-values.

B. No, because the domain of the function is not $(-\infty, \infty)$.

C. Yes, the function is 1-1.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because there is a y-value that goes to 2 different x-values.

19. Find the inverse of the function below. Then, evaluate the inverse at $x = 7$ and choose the interval that $f^-1(7)$ belongs to.

$$f(x) = \ln(x - 5) - 4$$

A. $f^{-1}(7) \in [59862.14, 59872.14]$

B. $f^{-1}(7) \in [24.09, 28.09]$

C. $f^{-1}(7) \in [162746.79, 162754.79]$

D. $f^{-1}(7) \in [0.39, 10.39]$

E. $f^{-1}(7) \in [59879.14, 59883.14]$

20. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -14$ and choose the interval that $f^-1(-14)$ belongs to.

$$f(x) = 4x^2 + 3$$

A. $f^{-1}(-14) \in [1.53, 1.84]$

B. $f^{-1}(-14) \in [2.88, 3.62]$

C. $f^{-1}(-14) \in [1.89, 2.14]$

D. $f^{-1}(-14) \in [3.81, 4.19]$

E. The function is not invertible for all Real numbers.

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21. Find the inverse of the function below. Then, evaluate the inverse at $x = 6$ and choose the interval that $f^-1(6)$ belongs to.

$$f(x) = e^{x-4} - 4$$

A. $f^{-1}(6) \in [-7.31, -2.31]$

B. $f^{-1}(6) \in [-1.7, 3.3]$

C. $f^{-1}(6) \in [-7.31, -2.31]$

D. $f^{-1}(6) \in [6.3, 9.3]$

E. $f^{-1}(6) \in [-1.7, 3.3]$

---

22. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 8x + 2 \text{ and } g(x) = \sqrt{3x + 14}$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-2.17, 1.83]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-5.67, -2.67]$

C. The domain is all Real numbers except $x = a$, where $a \in [2.25, 7.25]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [4.67, 12.67]$ and $b \in [6.67, 10.67]$

E. The domain is all Real numbers.

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23. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -14$ and choose the interval that $f^-1(-14)$ belongs to.

$$f(x) = 5x^2 - 4$$

A. $f^{-1}(-14) \in [4.27, 4.55]$

B. $f^{-1}(-14) \in [1.76, 2.08]$

C. $f^{-1}(-14) \in [1.22, 1.83]$

D. $f^{-1}(-14) \in [6.66, 7.48]$

E. The function is not invertible for all Real numbers.

---

24. Subtract the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 7x + 8 \text{ and } g(x) = \sqrt{-4x + 11}$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-5.6, -3.6]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-0.25, 3.75]$

C. The domain is all Real numbers except $x = a$, where $a \in [-11.2, -6.2]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-9.8, -4.8]$ and $b \in [-4.2, 1.8]$

E. The domain is all Real numbers.

---

25. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = -x^3 + 2x^2 + x - 3 \text{ and } g(x) = 2x^3 + 2x^2 - 2x$$

A. $(f \circ g)(1) \in [1.69, 3.52]$

B. $(f \circ g)(1) \in [-2.82, -0.76]$

C. $(f \circ g)(1) \in [3.04, 5.12]$

D. $(f \circ g)(1) \in [7.85, 8.59]$

E. It is not possible to compose the two functions.

---

26. Choose the interval below that f composed with g at $x = 2$ is in.

$$f(x) = -2x^3 + 3x^2 + 2x \text{ and } g(x) = -2x^3 + 2x^2 + 4x$$

A. $(f \circ g)(2) \in [-0.5, 0.1]$

B. $(f \circ g)(2) \in [-0.5, 0.1]$

C. $(f \circ g)(2) \in [9.4, 11]$

D. $(f \circ g)(2) \in [5.2, 9.2]$

E. It is not possible to compose the two functions.

---

27. Determine whether the function below is 1-1.

$$f(x) = -20x^2 - 247x - 713$$

A. No, because there is a y-value that goes to 2 different x-values.

B. Yes, the function is 1-1.

C. No, because the domain of the function is not $(-\infty, \infty)$.

D. No, because there is an x-value that goes to 2 different y-values.

E. No, because the range of the function is not $(-\infty, \infty)$.

---

28. Determine whether the function below is 1-1.

$$f(x) = 36x^2 + 300x + 625$$

A. No, because the domain of the function is not $(-\infty, \infty)$.

B. No, because the range of the function is not $(-\infty, \infty)$.

C. Yes, the function is 1-1.

D. No, because there is a y-value that goes to 2 different x-values.

E. No, because there is an x-value that goes to 2 different y-values.

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29. Find the inverse of the function below. Then, evaluate the inverse at $x = 10$ and choose the interval that $f^-1(10)$ belongs to.

$$f(x) = \ln(x - 3) + 5$$

A. $f^{-1}(10) \in [442417.39, 442419.39]$

B. $f^{-1}(10) \in [150.41, 156.41]$

C. $f^{-1}(10) \in [140.41, 151.41]$

D. $f^{-1}(10) \in [3269014.37, 3269023.37]$

E. $f^{-1}(10) \in [1097.63, 1104.63]$

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30. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 10$ and choose the interval that $f^-1(10)$ belongs to.

$$f(x) = \sqrt[3]{5x + 4}$$

A. $f^{-1}(10) \in [-199.5, -199.1]$

B. $f^{-1}(10) \in [198.4, 199.8]$

C. $f^{-1}(10) \in [199.5, 202.3]$

D. $f^{-1}(10) \in [-203.4, -200.2]$

E. The function is not invertible for all Real numbers.
